CLAIMS

1. A method for manufacturing a tyre comprising:
   - disposing an uncured elastomeric material on a substantially rigid support, so as to form a green tyre;
   - inserting said green tyre disposed on said support into a vulcanization mold;
   - closing the vulcanization mold so as to define a molding cavity between an outer surface of said support and an inner surface of said vulcanization mold;
   - molding and curing the green tyre, at least one portion of the green tyre being molded and cured at a substantially constant volume in at least one portion of said molding cavity;

   wherein the step of disposing said uncured elastomeric material on the support comprises:
   - determining a first excess material volume curve of said elastomeric material with respect to an available volume in said at least one portion of the molding cavity, versus a predetermined direction;
   - controlling a volume distribution of said elastomeric material on said rigid support so as to substantially fit said first curve.

2. A method according to claim 1, wherein said step of controlling said volume distribution of elastomeric material on said support comprises:
   - determining a first positioning specification set for a machinery associated to a deposition of said uncured elastomeric material on said support corresponding to said first excess material volume curve;
   - moving said machinery according to said first positioning specification set.

3. A method according to claim 2, wherein said step of determining said first excess material volume curve comprises:
   - providing a target excess material volume curve;

- providing at least a second positioning specification set for said machinery;
- determining a second excess material volume curve corresponding to said second positioning specification set;
- comparing said second curve with said target curve, so as to determine volume distribution differences between said second curve and said target curve versus said predetermined direction.

4. A method according to claim 3, further comprising:
   - determining a first cross-section profile of at least one portion of green tyre from said second positioning specification set.

5. A method according to claim 4, further comprising:
   - modifying said first cross-section profile using said volume distribution differences between said second curve and said target curve, thereby determining a second cross-section profile of said at least one portion of green tyre.

6. A method according to claim 5, wherein said step of determining said first positioning specification set for said machinery comprises:
   - determining said first positioning specification set at least from said second cross-section profile.

7. A method according to any one of claims 2 to 6, wherein said machinery comprises a robotized arm associated to said support.

8. A method according to any one of the previous claims, wherein said step of disposing said elastomeric material on said support comprises extruding said uncured elastomeric material in the form of elongated elements including said elastomeric material.

9. A method according to claims 2 and 8, wherein said first positioning specification set comprises a plurality of positioning records, each of said positioning records comprising at least spatial coordinates of a predetermined point of a cross-section of said elongated element.

10. A method according to any one of the previous claims, wherein said first, second or target excess material volume curve represents the following function:

$$EM(y) = \frac{V_{mat}(y) - V_{mold}(y)}{V_{mold}(y)}$$

wherein y is a variable representing said predetermined direction, $V_{mat}(y)$ is a volume of said elastomeric material comprised between a reference point of said vulcanization mold and a value y of said variable, $V_{mold}(y)$ is a volume of said mold cavity comprised between said reference point and said value y.

11. A method according to any one of claims 1 to 10, wherein said first, second or target excess material volume curve represents the following function:

$$\Delta M(y) = V_{mat}(y) - V_{mold}(y)$$

wherein y is a variable representing said predetermined direction, $V_{mat}(y)$ is a volume of said elastomeric material comprised between a reference point of said vulcanization mold and a value y of said variable, $V_{mold}(y)$ is a volume of said mold cavity comprised between said reference point and said value y.

12. A method according to any one of claims 1 to 10, wherein said first, second or target excess material volume curve is the following function:

$$EM_{loc}(y_1, y_2) = \frac{V_{mat}(y_1, y_2) - V_{mold}(y_1, y_2)}{V_{mold}(y_1, y_2)}$$

wherein y_1, y_2 are two predetermined values of a variable representing said predetermined direction, $V_{mat}(y_1, y_2)$ is a volume of said elastomeric material comprised between said values y_1, y_2, $V_{mold}(y)$ is a volume of said mold cavity comprised between said values y_1, y_2.

13. A method according to any one of claims 1 to 10, wherein said first, second or target excess material volume curve is the following function:

$$\Delta M_{loc}(y_1, y_2) = V_{mat}(y_1, y_2) - V_{mold}(y_1, y_2)$$

wherein y_1, y_2 are two predetermined values of a variable representing said predetermined direction, $V_{mat}(y_1, y_2)$ is a volume of said elastomeric material comprised between said values y_1, y_2, $V_{mold}(y)$ is a volume of said mold cavity comprised between said values y_1, y_2.

14. A method according to any of the previous claims, wherein said predetermined direction is a radial direction.

15. A method for controlling a disposition of an uncured elastomeric material on a rigid support for the manufacturing of a green tyre to be molded and cured in a vulcanization mold, said vulcanization mold and said rigid support defining a molding cavity such that at least one portion of the green tyre is molded and cured at a substantially constant volume in at least one portion of said molding cavity, said method comprising:
   - providing a first positioning specification set for a machinery associated to a deposition of said uncured elastomeric material on said support;
   - providing a cross-section profile of at least said portion of the molding cavity;
   - determining, from said first positioning specification set and from said molding cavity cross-section profile, a first excess material volume curve of said uncured elastomeric material with respect to an available volume in said portion of the molding cavity, versus a predetermined direction.

16. A method according to claim 15, further comprising:
   - providing a target excess material volume curve;
   - comparing said first curve with said target curve, so as to determine volume distribution differences between said first curve and said target curve versus said predetermined direction.

17. A method according to claim 15 or 16, further comprising:
   - determining a first cross-section profile of at least one portion of said green tyre from said first positioning specification set.

18. A method according to claim 16 and 17, further comprising:

– modifying said first cross-section profile using said volume distribution differences between said first curve and said target curve, thereby determining a second cross-section profile of said green tyre portion.

19. A method according to any one of claims 15 to 18, wherein said first or target excess material volume curve represents the following function:

$$EM(y)=\frac{V_{mat}(y)-V_{mold}(y)}{V_{mold}(y)}$$

wherein y is a variable representing said predetermined direction, $V_{mat}(y)$ is a volume of said elastomeric material comprised between a reference point of said vulcanization mold and a value y of said variable, $V_{mold}(y)$ is a volume of said mold cavity comprised between said reference point and said value y.

20. A method according to any one of claims 15 to 18, wherein said first or target excess material volume curve represents the following function:

$$\Delta M(y)=V_{mat}(y)-V_{mold}(y)$$

wherein y is a variable representing said predetermined direction, $V_{mat}(y)$ is a volume of said elastomeric material comprised between a reference point of said vulcanization mold and a value y of said variable, $V_{mold}(y)$ is a volume of said mold cavity comprised between said reference point and said value y.

21. A method according to any one of claims 15 to 18, wherein said first or target excess material volume curve represents the following function:

$$EM_{loc}(y_1,y_2)=\frac{V_{mat}(y_1,y_2)-V_{mold}(y_1,y_2)}{V_{mold}(y_1,y_2)}$$

wherein y_1, y_2 are two predetermined values of a variable representing said predetermined direction, $V_{mat}(y_1,y_2)$ is a volume of said elastomeric material comprised between said values y_1, y_2, $V_{mold}(y)$ is a volume of said mold cavity comprised between said values y_1, y_2.

22. A method according to any one of claims 15 to 18, wherein said first or target excess material volume curve represents the following function:

$$\Delta M_{loc}(y_1,y_2)=V_{mat}(y_1,y_2)-V_{mold}(y_1,y_2)$$

wherein y_1, y_2 are two predetermined values of a variable representing said predetermined direction, $V_{mat}(y_1,y_2)$ is a volume of said elastomeric material comprised between said values y_1, y_2, $V_{mold}(y)$ is a volume of said mold cavity comprised between said values y_1, y_2.

23. A method according to any of claims 15 to 22, wherein said predetermined direction is a radial direction of said green tyre.

24. A computer program directly loadable into a memory of a computer, for performing a method for controlling a disposition of an uncured elastomeric material on a rigid support for the manufacturing of a green tyre to be molded and cured in a vulcanization mold, said vulcanization mold and said rigid support defining a molding cavity such that at least one portion of the green tyre is molded and cured at a substantially constant volume in at least one portion of said molding cavity, the program comprising code portions being adapted for:
   - acquiring a first positioning specification set for a machinery associated to a deposition of said uncured elastomeric material on said support;
   - acquiring a cross-section profile of at least said portion of the molding cavity;
   - determining, from said first positioning specification set and from said molding cavity cross-section profile, a first excess material volume curve of said uncured elastomeric material with respect to an available volume in said portion of the molding cavity, versus a predetermined direction.

25. A computer program according to claim 24, wherein it further comprises code portions being adapted for:
   - determining a target excess material volume curve;
   - comparing said first curve with said target curve, so as to determine volume distribution differences between said first curve and said target curve versus said predetermined direction.

26. A computer program according to claim 24 or 25, further comprising code portions being adapted for:
    - determining a first cross-section profile of at least one portion of said green tyre from said first positioning specification set.

27. A computer program according to claim 25 and 26, further comprising code portions being adapted for:
    - modifying said first cross-section profile using said volume distribution differences between said first curve and said target curve, thereby determining a second cross-section profile of said green tyre portion.

28. A computer program according to any one of claims 24 to 27, wherein said first or target excess material volume curve represents the following function:

$$EM(y) = \frac{V_{mat}(y) - V_{mold}(y)}{V_{mold}(y)}$$

wherein y is a variable representing said predetermined direction, $V_{mat}(y)$ is a volume of said elastomeric material comprised between a reference point of said vulcanization mold and a value y of said variable, $V_{mold}(y)$ is a volume of said mold cavity comprised between said reference point and said value y.

29. A computer program according to any one of claims 22 to 25, wherein said first or target excess material volume curve represents the following function:

$$\Delta M(y) = V_{mat}(y) - V_{mold}(y)$$

wherein y is a variable representing said predetermined direction, $V_{mat}(y)$ is a volume of said elastomeric material comprised between a reference point of said vulcanization mold and a value y of said variable, $V_{mold}(y)$ is a volume of said mold cavity comprised between said reference point and said value y.

30. A computer program according to any one of claims 22 to 25, wherein said first or target excess material volume curve represents the following function:

$$EM_{loc}(y_1, y_2) = \frac{V_{mat}(y_1, y_2) - V_{mold}(y_1, y_2)}{V_{mold}(y_1, y_2)}$$

wherein y_1, y_2 are two predetermined values of a variable representing said predetermined direction, $V_{mat}(y_1,y_2)$ is a volume of said elastomeric material comprised between said values y_1, y_2, $V_{mold}(y)$ is a volume of said mold cavity comprised between said values y_1, y_2.

31. A computer program according to any one of claims 24 to 27, wherein said first or target excess material volume curve represents the following function:

$$\Delta M_{loc}(y_1,y_2) = V_{mat}(y_1,y_2) - V_{mold}(y_1,y_2)$$

wherein y_1, y_2 are two predetermined values of a variable representing said predetermined direction, $V_{mat}(y_1,y_2)$ is a volume of said elastomeric material comprised between said values y_1, y_2, $V_{mold}(y)$ is a volume of said mold cavity comprised between said values y_1, y_2.

32. A computer program according to any of claims 24 to 31, wherein said predetermined direction is a radial direction of said green tyre.

33. A computer program product comprising a computer readable medium on which the computer program of any one of claims 24 to 32 is stored.